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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/082,264	05/20/1998	JIASHU CHEN	CHEN-1-(5442	2496

7590 03/31/2003
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WASHINGTON, DC 20036-3307

EXAMINER

GRIER, LAURA A

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 03/31/2003

19

Please find below and/or attached an Office communication concerning this application or proceeding.

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77

Office Action Summary	Application No.	Applicant(s)	
	09/082,264	CHEN, JIASHU	
	Examiner	Art Unit	
	Laura A Grier	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-77 is/are pending in the application.
- 4a) Of the above claim(s) 27-77 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-20 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-15, 21, 23, 25 is/are rejected.
- 7) ☒ Claim(s) 8,22,24 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. **Claims 27-77** are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 13.

Claim Objections

2. **Claim 8** is objected to because of the following informalities: line 19, at the end of the equation, the period (.) is not needed. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-2, 9, 13, 21, 23 and 25** are rejected under 35 U.S.C. 102(b) as being anticipated by Begault, U. S. Patent No. 5438623.

Regarding **claim 1**, Begault discloses a multichannel spatialization system for audio signals. Begault's disclosure comprises the use of a digital filter wherein the filter includes the use a linear head related transfer function including a linear phase finite impulse response filter for providing spatial cues (col. 4, lines 62-62 and col. 5, lines 1-5 and col. 1, lines 53-63); and

provides a pair of headphones and/or electroacoustical transducers coupled to an amplifier for receiving the filtered signal and for converting and producing a sound to the for the listener (col. 4, lines 46-50), which constitutes a determining a spatial characteristic function for a position in space, applying the characteristic as a filter, producing a filtered sound and converting the filtered sound to a sound wave and producing the sound wave to the listener.

Regarding **claim 2**, Begault discloses everything claimed as applied above (see claim 1). Begault discloses the angle and elevation of the sound sources (col. 4, lines 24-28).

Regarding **claim 9**, Begault discloses a multichannel spatialization system for audio signals. Begault's disclosure comprises a system with audio inputs for receiving a signal based upon a plurality of positions in space (figure 1), the input generates to a left and right channel signal in a digital filter wherein the filter includes the use a linear head related transfer function including a linear phase finite impulse response filter for providing spatial cues (col. 4, lines 62-62 and col. 5, lines 1-5); and provides a pair of headphones and/or electroacoustical transducers coupled to an amplifier for converting and producing a sound to the for the listener (col. 4, lines 46-50).

Regarding **claim 13**, Begault discloses everything claimed as applied above (see claim 9). Begault discloses the angle and elevation of the sound sources (col. 4, lines 24-28). Begault inherently discloses means constituting a calculator with a computer program, as evident by the function of the digital filters (col. 4, lines 61-68 and col. 5, lines 1-26).

Regarding **claims 21, 23, and 25**, Begault discloses a multichannel spatialization system for audio signals (figure 1). Begault's disclosure comprises delaying a sound source signal in a digital filter (16₁-16₄), col. 4, lines 61-68 and col. 5, lines 1-26; attenuation and filter of an input

signal takes place in a low pass filter (12₁-12₄), col. 4, lines 7-10; further the digital filter provides more filtering and weighting of the filter sound signals (col. 6, lines 51-68, col. 7, lines 1-13, 42-53 and figure 2); and a summing network for summing the filtered sounds, wherein the filtered attenuated sound signal remains constant with a delayed signal, wherein the signals are adaptable to change position perspective in respect to the listener (col. 10, lines 48-68 and col. 11, lines 01-12).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 3-7** are rejected under 35 U.S.C. 103(a) as being obvious over Begault in view of Chen.

Regarding **claim 3-7**, Begault discloses everything claimed as applied above (see claim 1). However, Begault fails to specifically disclose a spatial feature extraction and regularization model, wherein the spatial feature extraction and regularization model comprises a spatial component and temporal component, with the temporal component including a matrix of a predetermined number of eigen vectors having a range of 3 to 16, and the spatial and temporal components are derived with a Karhunen-Loeve Expansion. The examiner maintains that such characteristic functions, thereof, were well known in the art.

Regarding the characteristic functions, Chen methods and apparatus for producing directional sound. Chen's disclosure provides support of a spatial feature extraction and regularization model; spatial component and temporal component (summed matrix of a predetermined number of eigen vectors ranging from 3 to 16); wherein the components are determined by a Karhunen-Loeve Expansion (col.4, lines 24-67 - col. 5, lines 1-53).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Begault by implement such characteristic functions and features for the purpose of optimizing the structure and performance of the device for improving binaural hearing of three-dimensional and/or virtual sound.

Regarding **claims 10-12**, they are interpreted and rejected for the same set forth in claims 3-5.

7. **Claim 14** is rejected under 35 U.S.C. 103(a) as being obvious over Begault in view of Chen.

Regarding **claim 14**, Begault discloses everything claimed as applied above (see claim 1). However, Begault fails to specifically disclose eigen filters and a plurality of source placement arrays. The examiner maintains that eigen filter and placement arrays were well known in the art.

Regarding the eigen filter, Chen methods and apparatus for producing directional sound. Chen's disclosure comprises eigen filters (col. 4e, lines 8-21, col. 6, lines 20-44, and col. 7, lines 6-21 and figure 5a).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Begault by implementing an array eigen filters for the purpose providing optimal and sufficient time delay of the signal to the respective ear channels, further Chen discloses the

filtering components may be used in the time domain method using inverse Fourier Transformation that yields impulse responses of basic filters (in which Begault teaches for his filters).

Allowable Subject Matter

8. **Claims 16-20** are allowed.
9. **Claims 8, 22, 24 and 25** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. **Claim 8** would be allowable if rewritten or amended to overcome the objection(s) set forth in this Office action.

Response to Arguments

11. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the arguments filed in paper no. 18, the applicant basically argues that the references of prior art fails to specifically disclose the concept of "...head related impulse response...". The examiner has introduced new reference of prior art that disclose the use of head related impulse function in relation to generating virtual sound. The reference of Chen is still maintained, wherein the concepts of Chen's invention is relevant to the claimed invention. Eventhough, Chen disclose specifically teaches HRTFs, however the concept and techniques are adequate support of the claimed invention, wherein Chen et al. indicates that aspects of the

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invention may be used in environments of sound recordings for three-dimensional and virtual sound.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura A Grier whose telephone number is (703) 306-4819. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

LAG
March 20, 2003


**MINSUN OH HARVEY
PRIMARY EXAMINER**



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

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Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
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